

Origin of Domesticated Vegetables.

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There are two methods of studying into the origin of our domesticated plants, the one historical, the other through investigation into the causes of variation. The first method has the disadvantage that events of this character but rarely find explicit record; the second that we as yet have deficiency of proper data. We are hence obliged, if we would attain truthful conclusions, to combine the two methods, and through pains-taking consulting of scattered mention, the guarded interpretation of hints to be gained from tradition and vernacular names, and the recognition of changes due to the acts of man, to follow the protean changes from course to course, until we either attain the limit of our knowledge or indication of the original species.

We may in the furtherance of this course recognize certain truths which we must consider axiomatic; that variation is an indication of changed environment, and that departure in the plant from the natural motive towards a motive more subservient to man's wants is evidence of man's interference; that as through man's agency plants become removed from natural conditions, and have qualities dependent upon domesticated conditions impressed upon them, so when neglected by man these acquired qualities disappear in a large measure, and the plant changes, not reverts, to conditions which enable it to satisfy the requirements of nature; that change of form, added to the plant through man's selection, if beneficial to the plant, when left to nature will be maintained in the plant escape or garden wilding; that a large number of varieties is an indication of antiquity of culture, especially if such varieties are of different types.

Applying these thoughts to a case in illustration, we should at once infer a greater antiquity of origin for the turnip than for the ruta-baga; for the carrot than for the parsnip; and where the varieties and types are very many, as in maize, wheat, beans, etc., we would infer very great antiquity of culture. So seedless fruits indicate man's ancient interference, and should only be expected to occur in regions which are or have been occupied by man.

If a highway leads from Jericho to Jerusalem, it is certainly proper to infer that the same road leads from Jerusalem to Jericho. If variations of a certain kind are produced only by man's interference, if the fact be well established, it is certainly proper to infer that if variations of this kind are found they indi-

cate a former cultivation. We can even go further and say that if the agency of man induces numerous variations favorable to man's wants in a species, then that the presence of numerous variations in a species, of a kind favorable to man, indicate a previous agency of man. Thus, the peculiar distribution of the *Vitis Californica* in rows, near Fort Whipple in Arizona, is considered conclusive evidence that the ancient Pueblo Indians were in the habit of cultivating it; evidence of a dissimilar character, but very nearly as conclusive, for the ancient cultivation of the *Vitis Labrusca* is seen in the variability of this species, which is strikingly in the direction of the improvement of the fruit in individuals, as is known to the many farmers in New England who have transplanted improved kinds to their door-yards, and is a matter of common repute, as well as evidenced in the various named varieties, as the Concord, which have originated from its seed. If we plant the seed of the apple, as we note the varying quality of the seedlings, no two being alike, we can infer from this circumstance that the apple is a domesticated fruit, and of human origin; if we likewise plant the seeds of the American Crab, we can properly infer that it is a wild or natural species from the power its seeds possess of coming true to name. This method of research, if supplemented by a historical record, offers much promise to the investigator.

When we consider the number of species of vegetables that America has furnished to civilization, their number of variations, their high degree of improvement, and their constancy to type, we may infer, *prima facie*, that a civilization capable of producing these results has existed in the past. We need but mention the maize, the bean, the pumpkin and squash, the tomato, peppers, the potato, the cassava, chocolate, etc., etc.

It is not improbable that many of our so called natural species to which our domesticated varieties are referred, are themselves but escapes from a cultivated state. I do not know whether the wild parsnip of America has a close resemblance to the wild parsnip of Europe or not. We can not readily suppose that the wild parsnip was really brought to America, for it appears more reasonable to believe that it is an escape from cultivation; as the salsify certainly is about Geneva. In default of any mention, we certainly would be justified by common consent to refer our cultivated parsnip for origin to our wild parsnip, and yet how erroneous this would be. The same remark applies to the carrot. Should we not therefore be slow to refer the cultivated parsnip to the wild parsnip of European fields, or the cultivated carrots to the

wild carrots? *Avena fatua* is supposed to be the parent form of the cultivated oat, but why not more reasonable to suppose it to be an escape, modified only from the cultivated oat in order to meet the conditions necessitated by its struggle under nature's conditions?

The history of the Indians, after the discovery, shows that they were greedy for new sources of food supply, and the facts connected with their habits of living all show that they exercised a care over vegetable productions. Thus the melon and the peach received distribution over wide areas in advance of a European discovery; the onion was even mentioned by Cortez as found in Mexico; the maize, the bean, and the squash, in varieties, all plants of tropical origin, and which could not maintain themselves without care, were staple crops throughout northern America, even to Lake Coulonge on the Ottawa river, and beyond the St. Lawrence, where the crops required seeding, protection and preservation of seed over the winter months. The sunflower was grown for its seed by the Hurons, as seems also to have been the Jerusalem artichoke for its roots. Bartram notes seeing in the south a plantation of hickory nuts cultivated by the Indians. The *Prunus Americana* seems to have been planted by the New England natives, and this seems also to have been the case with *Prunus Chicasa* in the southwest, although I find no distinct mention of the fact. Numerous other illustrations occur in my notes of a cultivation or domestication of plants throughout America, and a care and curious concern about forms and colors which must have caused selection to have been exercised; at any rate, when we have so-called wild species of the same varieties, the variability of these wild species in the portion which finds use is noticeable.

Indeed, the careful student must recognize that the American Indians were an agricultural people wherever natural conditions and tribal strength would admit, and that they were efficient agents not only in the geographical distribution of certain plants, but also in the producing of varieties. Circumstances, as in European nations in times past, made the tribes usually hunters and agriculturists, often agricultural solely, and again devoted wholly to the chase, and living on wild productions.

The history of the origin of our American vegetables must come from a close study of the history of a people, as well as from a study into the causes and effects of variations. These two methods in time may admit of certain generalizations, and it seems safe to assume that the results of such a study will not be

in accordance with accepted notions. The physiological method will bring a certainty so far as it accomplishes a conclusion, which the method of systematic botany does not supply. Until we can separate escapes from natural species, that is, until we can determine species apart from changes impressed upon plants by man, it seems unsafe to refer our cultivated plants to localities wherein occur wildings of like species. Far preferable the argument from historical mention of the habits and movements or migrations of peoples. It seems probable that *variability or true-ness to seed may become the test as to the sufficiency of a conclusion in favor of or against an assigned species.* This fact is an interesting one for the scholarly botanist, for it only needs the reading of De Candolle's work to realize the uncertainty at present existing.

GENERAL NOTES.

Notes on Mahernia.—The genus *Mahernia* in the natural order *Sterculiaceæ* presents many points of botanical interest. Our readers doubtless are familiar



A stamen with fan-like row of hairs at *f*, and fleshy disk at *d*.

with the shrub as it occurs in conservatories, with its pinnatifid leaves, very large and lacinate stipules, appearing like a whorl of leaves, and cymose clusters of honey-yellow flowers. These stand two together, bell-shaped and pendant from the branches. The blossoms possess a most delicious fragrance. I have elsewhere recorded the observation of Miss Anna Chace, of Valley Falls, R. I., that of the two flowers one is always convolute to the right, and the other to the left.

I have now to mention some notes that I made upon the species last winter in relation to the manner in which its nectaries are protected from small predatory insects. It will be remembered



A petal with its nectary, *n*.

that the five stamens are somewhat monadelphous, and that they stand opposed to the five petals. This ante-position suggests the suppression of